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Cloister in the Campo Santo, Genoa, Italy.
(Gelatine Print issued only with Imperial Edition.)
Church of Our Saviour, Roslindale, Mass.
The Boston Building, Denver, Cool.
A Modern Palace, Genoa, Italy.
The Campo Santo, Genoa, Italy.

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THE last chapter in the history of the competition for the Criminal Court Building in New York is the most interesting, if not the most edifying, of all. It will be remembered that three plans were selected by the "experts" called in to consider them, and that the Board of Commissioners, not satisfied with the award, appointed a committee out of its own number, which, strange to say, hit upon the same plans that had already been recommended by the experts. The question then came up on the final choice between the three selected ones, and, after some broad hints as to the "exorbitant" character of the ordinary architects' commission of five per cent, the authors of the three chosen plans were invited to appear before the Board. One of them, the signer of the plan marked "*Droit en avant*," was prudent enough, seeing the way that matters were going, to stay away, and is to be congratulated on his discretion; the other two, Mr. J. W. Wilson, of the firm of Thorn, Wilson & Scharschmidt, and Mr. Napoleon Le Brun, came in, and proceeded at once to the point by saying what they thought their services were worth. Mr. Le Brun said, it is alleged, that he thought the building could be erected for thirteen hundred thousand dollars, and that he would make the plans, including furnishing the paper and ink, and supervise the construction, for three per cent on the cost. Mr. Wilson said that he had somewhat hurriedly "estimated" the cost of executing his design at one million dollars, but now thought it would cost about forty per cent more than that. He would make all the plans, including furnishing the paper and ink, and supervise the building, for two per cent on the cost. This liberal offer appears to have pleased the Commissioners, and Mr. Wilson's plan was unanimously adopted.

THE movement now in progress for bringing about a closer relation between the republics of the Western hemisphere is an important and interesting one, whether it is successful or not. It does not seem very likely that sentimental considerations will induce the people of Chili and Venezuela to buy their dry-goods and groceries from New York, if they can get them cheaper from Liverpool or Bremen, so that the course of trade will probably remain without much change, notwithstanding the apprehensions of some of the English papers as to the result of the conference soon to be held in Washington, but, although the United States is, perhaps, hardly likely to be taken into the fold, a confederation between the Spanish-American States of South and Central America, which seems quite possible, would be one of the most serious events of the century. In our own self-satisfaction at our political importance, we hardly realize that the present population of South and Central America, including Mexico, is not very much less than that of the United States at the time of the Civil War, and that it is increasing with great rapidity, while in military and naval force the combined South American States far surpass us. Moreover, the common idea, that the Spanish-American States are too warlike, and too jealous of each other, to form a permanent union, needs now to be considerably modified. Not only are the South American States as closely allied in blood and feeling as our own colonies at the time of the Revolution, but a long step has already been taken toward confederation in the establishment of a judicial union, which has been for some time in force, and under which the decree of a court of record in one State is binding in the other States. In our own country, after a hundred years of existence as a nation, the States have hardly yet surrendered their judicial independence so far as this, and the fact that such a measure should have been adopted shows that the feeling in favor of a more complete political unity must be already tolerably strong in South America, and that a man of strong will, like many of the heroes of South American politics, might use it to bring about great changes in the condition of affairs. It might not be altogether pleasant for the United States to find suddenly, on the day after a South American election, that it thenceforth shared the Western continent with a nation equal in population to Great Britain, well equipped with soldiers and ships of war, and governed by an ambitious dictator, with a thirst for picking quarrels with his neighbors. Of course, in a contest with such a nation, it may be presumed that Anglo-Saxon persistence would win the day at last, but a fleet of ships like the Chilian "*Esmeralda*" would at the present time make short work of our great seaports, and, while we may feel a just confidence in our courage and resources, it would not be amiss to treat people who have been kind and modest friends, and who may become powerful enemies, with a little more courtesy and discretion than we have occasionally shown toward them.

THE *Commercial Advertiser* publishes some remarks, which it attributes to Mr. Park Benjamin, of New York, about Dr. de Bausset's proposed air-ship, in which Mr. Benjamin is represented as saying that the air-ship is "either a fraud or the result of an extraordinary scientific blunder," that it is "not practical," and that its inventor has probably "become misled on the subject of air pressure and the weight of air." As the article spells "subtract" with one more "s" than the dictionary allows, we are inclined to think that the whole story is the invention of some ignorant newspaper reporter, particularly as it represents Mr. Benjamin as saying that "The idea of a vacuum having a lifting-power, a force to buoy up, is simply ridiculous." It is hardly necessary to say that it would be a great deal more ridiculous for a man pretending to a knowledge of the elements of physics to deny that a vacuum has "a lifting-power, a force to buoy up," exactly equal to the weight of the air which it displaces, which is all that Dr. de Bausset claims, but even this forgetfulness of facts in science, which every school-boy knows, is less displeasing than the absurd and childish misrepresentation by which the remaining portion of the article seeks to discredit Dr. de Bausset's well-studied scheme. The imaginary Mr. Benjamin, whose arithmetic appears to have been as much neglected as his spelling, is reported to have said that Dr. de Bausset "bases his calculations apparently on the following statement: 'The weight of a cubic yard of air is 263 pounds, and thus the weight of air in this immense car will be 721,873 pounds.'" The supposed scientific expert is represented as going on to say that "This is unquestionably a wonderful discovery. I know of nothing more calculated to astonish the scientific world than the startling announcement — not of the invention of the air-ship — but of the remarkable change that must recently have taken place in the weight of air." "I have consulted various authorities on the subject, and I cannot find one that does not cling to the fallacy that a cubic foot of air weighs only about an ounce and a quarter, and that a cubic yard of air does not weigh 263 pounds, but only a very little more than two pounds. This condition of nature's affairs would necessitate a slight revision of Dr. de Bausset's calculations, resulting in the conclusion that the weight of air in the immense car would not be 721,873 pounds, but about 78,300; so that giving Dr. de Bausset the benefit of all this difference in weight, it would seem that the problem which he claims to have solved is that of lifting a weight of 415,696 pounds by means of only 78,300 pounds of power." "Any man who can do this," he goes on to say, "is a magician. I can sum up my opinion of this great discovery

in one word, — it must be a miracle," and "the effort to lift one's self over a fence by the boot-straps pales in comparison."

ALL these elegant sarcasms, although proceeding from one who is alleged to have "obtained a full description of the proposed air-ship," and to have "studied the plans thoroughly," have a certain weakness; they are based on what appears to be a wanton and designed misrepresentation of Dr. de Bausset's calculations, and are pursued, not only without any attention to the real point of the matter, but with a carelessness in regard to the simplest details which would be ludicrous, if it did not appear to be malicious. Referring to Dr. de Bausset's book, which we have at hand, we find that he gives, on page 19, the weight of air as 2.63 pounds to the cubic yard. The decimal point is perfectly distinct, and the weight thus given is that upon which all authorities are substantially agreed. Moreover, all Dr. de Bausset's calculations are based on this weight, and the result at which he arrives, that his car will have a displacement, that is, a gross buoyancy, of 720,000 pounds, agrees with that at which every one must arrive who applies the multiplication-table with ordinary skill to the dimensions of the car as given in his book, and correctly quoted by the *Commercial Advertiser's* ideal scientific man. Concerning the arithmetical process by which the latter comes to the conclusion that as Dr. de Bausset took the weight of the air one hundred times too great, therefore the displacement of the car would be 78,000 pounds, instead of 720,000, we need make no remarks. It is fortunate that Dr. de Bausset did not have to depend upon experts of that sort to make his computations for him. As we said at the beginning, it is incredible that a man of Park Benjamin's reputation should really have fallen into such a series of blunders, and the editor of the *Commercial Advertiser* may have his attention called in an unpleasant manner to the fact that he has discredited what he calls his "recognized authority on scientific matters" a good deal more than he has the project which he calls "a large and magnificent impossibility, and probably a fraud."

THE *Builder* gives an interesting description of the new Hôtel de Ville at Paris, with the works of art in the shape of pictures and statues which have actually been placed in it. As every one knows, the building is as far as possible a reproduction of that destroyed by the Commune, with some remodelling and enlargement of the plan. Although nominally a town-hall, the municipal offices occupy only a small part of the building, the rest being taken up by enormous reception-rooms and banqueting-halls, and on these the best sculpture and painting to be had in France has been lavished. The *Builder* describes more than two hundred statues in its account, all by the most distinguished sculptors in the country, without counting the bas-reliefs and bronze figures intended merely for ornament; and the walls and ceilings not decorated in some other way are now being painted by Benjamin Constant, Clairin, Bonnat, Puvis de Chavannes, Besnard, Jules Lefebre, Louis Loir, Lhermitte, and many other artists equally eminent. More astonishing, however, even than the wealth of artistic interest which is to be crowded into the building is the smallness of the price at which it is all to be obtained. The construction of the whole has cost about three million, six hundred thousand dollars, and three hundred and twenty-five thousand more has been spent on sculpture, while five hundred thousand has been appropriated for the painted decoration of the interior. The total of all these amounts to about four million, four hundred thousand dollars, for which Paris will acquire a structure covering three acres of land, with, perhaps, the most splendid expression in modern times of the three great arts. We are well aware how reprehensible it is to compare foreign buildings with our own, but we cannot help wondering if the time will never come when Americans, by spending four times as much as the Hôtel de Ville has cost, can get something better than a building in which the principal decoration is a monument to the meanest and most impudent piece of corruption that even American politics has to show, and where one thanks fortune, with reason, that the sculpture and painting usual to our public buildings has been dispensed with.

M. MARCEL DALY gives, in *La Semaine des Constructeurs*, a test for discovering whether a given brand of Portland cement is liable to swell after setting, which is new to us. Every one knows that much of the Portland cement shipped to the United States, together with a great deal of that used elsewhere, is apt to expand, perhaps some months or even years after setting, losing its hardness, and bursting or injuring the work on which it is used. The most noted case of the kind is that of a sea-wall in England, which, a long time after it was built, began to come to pieces, and at last had to be taken down and rebuilt. To avoid such catastrophes, it is common in England to expose the cement to be used in a building to the air for some weeks before making it into mortar, and some of our best engineers discourage the use of Portland cement altogether. With proper precautions, however, Portland cement is an excellent material, and M. Daly, who appears to have derived his information from the accounts of the experiments of Professor Tetmajer at Zurich, says that the propensity to swell in air may usually be detected by mixing some neat cement with water and pouring out the paste on two smooth plates of glass or metal, so as to form two cakes about four inches in diameter and three-eighths of an inch thick. The two plates are then to be placed in a damp box for twenty-four hours, or until they have set completely. After this they are to be taken up, without disturbing the position of the cakes, and put in an oven, which is to be gradually heated to about two hundred and fifty degrees Fahrenheit. In this temperature they are to remain for two or three hours, or at least half an hour after steam has ceased to rise from them. If, after this treatment, the cakes are twisted or warped, or show cracks radiating from the centre and larger toward the outside, the cement is to be rejected, at least for constructions in the air. An appearance of small cracks running concentrically around the cake need not condemn the cement, as such an effect may be caused by too rapid drying. Where the cement is to be used under water, or where adulteration with plaster-of-Paris is suspected, similar cakes should be made, using for mixing a trifle more water than in the first case, and thinning the cakes toward the edge. After subjecting them to the test already described for disposition to swell in air, they are to be placed in water and left there for at least four weeks. At the end of that time, if they show no sign of twisting or any radiating cracks, they may be considered free from liability to swell under water.

A LOTTERY, under the direction of Government officials, is to be held in connection with the Paris Exposition, with a semi-charitable purpose which takes away from it some of its objectionable character. Fifteen million tickets are to be issued, and placed on sale, at the uniform price of one franc each, at the tobacco stores and other places where postage stamps are sold, and are even to be sent into the remote rural districts, under the care of the tax-collector, who will fill orders for them. One-third of the proceeds of the sale of the tickets, which, if they are all sold, will be nearly three million dollars, is to be devoted to paying the railroad fares and entrance fees of certain classes of persons, to be designated by the Government, who would otherwise be unable to afford the expense of going to see the exhibition, and the remaining two-thirds is to be spent in the purchase of interesting objects from the exhibition, which are to be distributed by lot among the holders of the tickets. The French are fond of lotteries, and by this ingenious scheme the exhibition managers will please the exhibitors, who will be glad to sell their goods at the prices they ask, and will sell a considerable number of admission-tickets to persons who would otherwise be lost to them. There is, however, nothing unfair about the plan, and if every person who buys a ticket has the prospect of having two-thirds of its value returned to him in a prize, he is better off than in most lotteries.

MEYERLING Castle, where the Crown Prince Rudolph met his tragic death, is, according to the *Weiner Bauindustriezeitung*, to be turned into a convent for Carmelite nuns. The room in which the Crown Prince died is to be formed into a chapel by extending it so as to comprise the next chamber, and by the removal of the ceilings and the substitution of a domed vault, which is to include the rooms above. The apartments for the nuns will be fitted up, with such additions as may be necessary, in the simplest manner. The smaller buildings attached to the castle are to be converted into an asylum for ten invalid or superannuated foresters from the neighboring territory.

BUILDERS' HARDWARE.[1]—XXIX.

DUMB-WAITER FITTINGS.

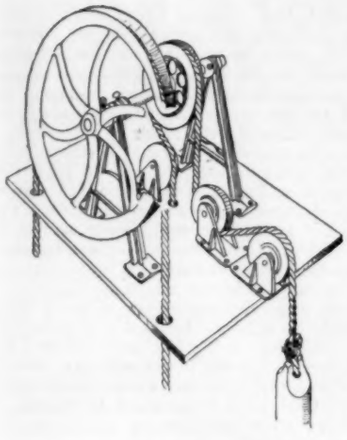


Fig. 451. The Cannon Dumb-waiter.

THERE are three styles of dumb-waiters in common use. For the cheapest sort of work, a rope is attached to the top of the car, carried up over a wheel, down one side to the bottom of the well, under a second wheel and up to the bottom of the car, to which the end of the rope is attached. A counterbalance weight is connected with the top of the car by a rope passing over a third wheel.

Another style is shown by Figure 451. A rope is fastened to the top of the car and passes about the four small wheels to the counterbalance weight on one side. One of these wheels is on the shaft of a large wheel over which a thick rope is carried and continued around a similar wheel at the bottom of the shaft. This holds on the large wheel simply by friction, and in moving, winds up or lowers the hanging-rope.

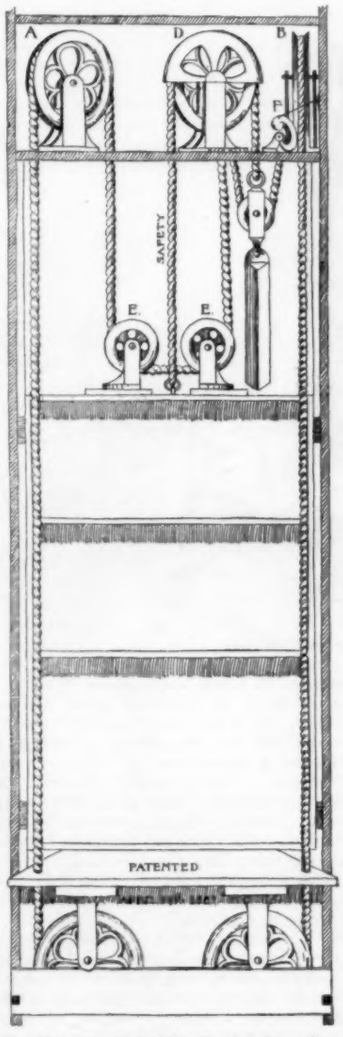


Fig. 452. New York Safety Dumb-waiter. Edw. Storm Spring Co.

The third style is illustrated by Figure 452, with a plan of the upper gearing, Figure 453, and a diagonal view of the upper works, Figure 454. A rope is attached to the bottom of the shelf on which the upper wheels rest, starting at 1, Figure 453. Thence it is carried down to and under the wheels *E E* on the top of the car, up through 2, over wheel *A*, and down through 3 to the wheels at the bottom of the shaft. Then it is brought up through 4, over wheels *B* and *C*, and there connected with the counterbalance by a pulley, the end of the rope being fastened to the under-side of the top shelf, close by where it started. A safety-rope is attached to the top of the car, carried up through 5, over pulley *D*, and connected with the counterbalance. A cam-brake, Figure 455, on the shelf beside 4 prevents the car from descending when heavily loaded. It will be seen that all the working connections are made with a single rope, so arranged that no matter how much it may stretch, it will always be taut, the slack being taken up by the counterbalance, so that the slightest motion of the rope will start the car. This style is very generally used in good work.

The doors at the openings into the dumb-waiter shaft are

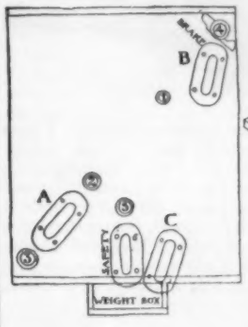


Fig. 453.

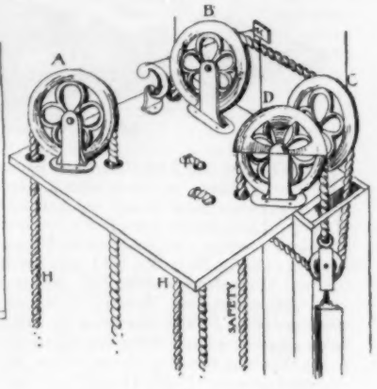


Fig. 454.

usually hung in the same manner as an ordinary window, and are provided with some form of spring-catch like Figure 456,

Fig. 455. Brake.

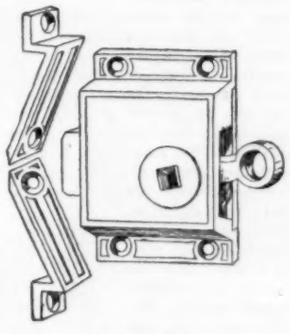


Fig. 456. Catch.

which will hold the door either up or down, the catch being released by depressing the arm at the side.

The following table gives the average retail prices of the miscellaneous articles described in this chapter.

TABLE OF MISCELLANEOUS HARDWARE.

Fig.			
417	Brass Screw-hooks	per doz.	15 to 25 cents.
419	Picture-hooks	per doz.	35 to 42 cents.
420	Chandelier-hooks, 6-inch screw	each	58 cents.
422	Hammock-hooks	per doz.	$ 1.12
423	Clothes-line hooks, 4 screws	per doz.	.42
	Stair-rail brackets	per set	.10
429	Letters and numbers, 2-inch	each	.35
430	Letter-box plate, plain	each	.75
436	Bell-fixtures, complete without wire	per set	1.00
	Bell-gong, bronze handle	each	.75
	Gate-fixtures, hinges or latches	per set	25 to 50 cents.
452	N. Y. Safety Dumb-waiter fittings	per set	15.00

[To be continued.]

MODEL OF THE CENTENNIAL BUILDINGS OF 1876. — Mr. John Baird, of Philadelphia, has had a dozen men employed for more than a year, making an exact model of the Centennial buildings and grounds. The design is now completed, and, through Mayor Fitler, Mr. Baird has offered it to that city. The model is thirty feet in diameter, and cost between $12,000 and $15,000. Trees, buildings, people and a thousand peculiar features of various kinds are reproduced with wonderful skill. It is proposed to put the model under a plate-glass case in one of the Philadelphia parks. The case will cost about as much as the model. — *Exchange.*

[1] Continued from No. 704, page 293.

AN ARCHITECTURAL KNOCKABOUT.[1]—III.

FROM Brussels I went to Paris by the lightning express. I have never ridden at such speed, certainly not in such rickety carriages: they would squirm and turn with frightful jolts. Leaving Paris I went down to the South of France by Lyons, Dijon and Toulon, stopping a night at each of these places, till finally I arrived at Marseilles. Here the cold was terribly severe, but its bitterness did not prevent my visiting the objects of interest here, and making a few little sketches. Marseilles is one of the most picturesque and peculiar cities I have ever been in. It lies in a valley, so to speak, with its railroad and depot far above the city proper.

By climbing the very steep hill on which is perched the splendid church-fortress, "Nôtre Dame de la Garde," with its great statue on the summit of the tower,—the figure, which is supposed to represent the Virgin holding her child, is terribly out of proportion with the structure below, it being far too massive—one can see the whole panorama of the city,—the beautiful harbor, which reminds one of Naples, with its royal park coming to the very edge of the sea, with well-made roads winding in and out along the shores, the water of that glorious Italian blue making the scene by far too lovely for me to describe. One can see the whole city in plan as it were, and can perceive the inhabitants moving like tiny ants far, far below.

Notre Dame de la Garde, Marseilles.

The greatest object of interest to me was, quite away out to sea, the Château d'If, made famous by Alexandre Dumas. There it was, black and sombre against the blue sky. I seemed to see it in its tyrannical glory of long ago, and the story of the incarcerated abbé and young Edmond Dantes came vividly before me.

Descending, I visited the Ecole des Beaux-Arts and the Arc de Triomphe, and finally looked over and sketched that wonderful toy, for such it almost is, Le Palais de Longchamps, nothing more nor less than an artificial waterfall, but so constructed and fashioned that it makes a tiny Niagara, through falling from architectural motives into innumerable individual falls: mammoth carved-stone bulls roar and plunge in the water, while an enormous buffalo splashes and snorts with an accompaniment of wild horses, all spouting and bathing in the roaring cataract around them. A great central building done in that very ornate French Renaissance surmounts the falls, while two columned galleries running on a curve start out from either side, and end in a structure similar to but smaller than the central motive. Great stairways ascend to the galleries on either side, with every conceivable form of balcony and place of observation at all the landings. It was very beautiful, without a doubt, but hardly practicable for Central Park, New York, for instance. I was very anxious to go over to Algiers and get warm as the trip was very inexpensive, but as I thought that Italy was just as heating and as I really was very anxious to get there, I left Marseilles at night, in a second-class compartment of a train which took twenty hours to get to Genoa, along the Riviera. I had suffered a great deal from the cold, but to arrive at Nice and find it in a condition of frigidity sufficient to suggest the building of snow-forts or the rigging up of a tobogan-slide somewhat dashed and broke up my roseate ideas of Italian sunshine. I made up my mind that this temperature was exceptional, as every one had told me I would suffer from the heat in Genoa and Middle Italy. Suffer from the heat! I can never do that again.

At Genoa I put up at a little hotel jammed into a chaos of buildings; it was situated near the bourse, and one on going out had very nearly to tie a string to his person to trace his way back through those miserable little Genoese alleyways. It rejoiced, with its proprietor, in the good old familiar name of "Smith," "Albergo del Smith." It was originally a monastery, and had in each story, one exactly over the other and identically the same, a bake-oven. I examined these with interest and made a rapid sketch of one. Those old monks! Mr. Smith told me (it did me good to pronounce a name that didn't end either in an i or an o) that he had found many rich carvings that had been plastered over when he came there. The clergy in Italy interested and amused me, and I made many a sly sketch of some old hooded father. Once I passed a funeral-march of the Brethren of the Misercordia, which was startling in the extreme. The greatest object of interest, or it was to me, in Genoa, was the Campo Santo with all those wonderful statues, one of which was a monk reading his prayer-book in a cloister. I passed it, thinking it to be a white-hooded father, but not seeing him move when I returned, I was startled and surprised to find it was only carved out of stone. I had a good American thrill one day when I stood before the statue and monument of Christofero Colombo, of 1492 fame. I remained in Genoa about ten days, during which time I devoted myself to the artistic most assiduously.

About this time I was seized with an uncontrollable desire to economize. Paris had reduced the "surplus" somewhat. I wanted to get to Rome. I was a little vague as to where Rome actually was and how one got there, but by plunging desperately into "Baedeker" I emerged therefrom with a perfect knowledge of its location, and with the great question as to my getting there decided, namely, to go by ship to Leghorn, from thence to Naples and then on to the Eternal City. The main reason for this scheme of mine was, that while I was sitting at home one night by a crackling wood-fire, I was told by an experienced traveller that the only true way for a man to travel on the Mediterranean, either winter or summer, was to take a deck-passage, thus, lying on the deck with cigar and Bologna sausage in hand, listen to the strains of the immortal "Funiculi," rendered by the soothing guitar and mandolin, and arrive—anywhere. This all sounded simply beautiful, the fact of finally arriving somewhere was something, so acting upon the impulse of the moment I started for the office of the Mediterranean Steamship Company. After having wandered in every conceivable circle through those bare Geonese alleyways, I arrived at last at my destination. Then by dint of perseverance, bad French and worse Italian, the latter of my own construction, I managed to address the official in something like the following: "*Arrete un batello a vapore che faccia il tragitto a Napoli,*" and "*Si ferma esse ad Livorno,*" or in better English, "Is there a boat going from here to Naples, and does it stop at Leghorn." To my delight I found that there was, and that the steamer would sail on the next night. The ticket-agent inquired what class I preferred, I replied that I wished the deck-passage. He seemed to misunderstand me and repeated his question, my answer being the same, he smiled and handed me a fourth-class ticket. I learned from the perusal of this document that deck-passengers were provided with no bed nor food—this dreadful fact took away the poetry of the thing decidedly I thought, but I resolved to see it through. Going back to my room I found that in "cashing up" I had made about $52.64 by choosing this cheap mode of travel in preference to that by the railway—the trip by boat costing about $6.75. Having made all this money I felt that I had a right to dissipate slightly before starting on my journey, so I indulged in a fine dinner and went to the opera. The next day I purchased a bologna sausage, huge in dimensions, a stick of bread

[1] Continued from No. 707, page 16.

and a piece of Italian cheese for my sustenance on the trip. Provided with these articles I knew I could sustain life or meet death, for I really began to have doubts which of the two would be the most formidable to combat. As to baggage I had none to speak of, merely my knapsack, in which I kept my sketch and guide books and a few necessary articles. I had not even brought my blanket with me, only taking my rubber mackintosh, for people told me I would suffer so from the heat: I was then so cold I could hardly speak! Imagine any one ever suffering from the heat in Italy or anywhere else. The official at the steamship office told me that my noble ship, the "*Magesta*," had anchored over the bar, and was to sail at nine o'clock. I was to go to a certain dock and get myself rowed out to the ship. So on the night of my departure I went to the appointed wharf and waited for some sort of conveyance to take me out. The night was cold and misty, and sitting there for three-quarters of an hour alone was not cheering to my frame of mind.

At last I heard the splash of oars as a small dory came out of the gloom propelled by a jagged old boatman. I said the one word "*Magesta*" in answer to his rapid remarks which I interpreted to be an offer to take me out to any ship. This was all that was necessary for him to comprehend the situation.

He silently took my knapsack and placed it in the bow. I as silently squatted down in the boat, and was soon being rowed away from the shadow of the shore. We passed great steamers; each one I thought was my own, till finally my boatman pointed to a dark

Porta Pila, Genoa.

object resting on the water, and exclaimed: "*Il 'Magesta,' ecco!*" Looking up, I saw a small steamer with sailing lights displayed, and everything in evident preparation for immediate departure.

I was hailed in Italian and French. I answered that I was a passenger, and wanted something "let down." In a second after paying my boatman I was on the deck. I was then addressed by an officer whom I supposed to be the purser (if they ever have pursers on board these vessels). He asked me for my ticket, and, at the same time, taking me in from head to foot by the light of his lantern.

On looking at my fourth-class ticket he smiled grimly, and ventured the remark that I had made a mistake. What could he mean? I was then told to go aft; so aft I went, stumbling over boxes and barrels as I groped along in the direction he indicated. I soon sat down on a coil of rope, and thought the situation over. Things did not look bright at all. It was cold and damp, and the idea of sleeping on the deck, wet and hard, with no other covering than the mackintosh I had on, and with no other sustenance than the bologna and bread I had brought, became disheartening in the extreme. I then said to myself: "I'll see exactly what I'm in for." So still groping in the semi-darkness, I went to the extreme end of the ship, where I discerned a mass of moving figures. "Oh," said I, "these are probably the steerage passengers." Still continuing further to take a look at these people, I missed that continual jabbering which one always hears among that class of Italians. This seemed peculiar, when, to my utter amazement and disgust, I found that I was standing amidst about four hundred head of Italian cattle.

Retracing my steps, I made my way to the extreme opposite end, the bow, only to find it crowded with about two hundred cavalry horses and their riders, who were on their way to Naples. This was too much; so, finding an officer, I went up to him and asked in as polite French as I was master of "if there was any deck space for a man of my inches to lie down upon; if so, for Heaven's sake, let's see it." He smiled and told me, pointing to the boiler of the ship, which was raised on the deck, now covered black with men, women and children, that that was all the accommodation a deck passage afforded. Imagine my feelings as I surveyed this living mass before me to see if it was possible (if I could bring myself to it) to find space enough to lie down among them, but there was not even space enough to lay my bologna down. Thoroughly disheartened by this sad reality, I went to the same officer and said that as I had found no place to sleep I had decided to raise a class. This would only cost me two or three dollars extra, so I felt as bravely economical as before. This was third class, and I "bunked" with the soldiers *en masse*. This was, it is needless

S. Ambrogio, Genoa.

to say, luxury compared with my former condition. The vessel finally got underway, and the mob turned in at nine o'clock, Italian time.

I was still rather anxious to find out what I had in the way of a berth, so I followed the crowd of cavalrymen below. The third-class saloon was located under the main deck — a dark hold with one lantern in it. The beds were mere planks sliding up and down on two iron rods. In the daytime, these planks were pushed up and caught to the ceiling. They used the place in the day for peeling the potatoes and mixing the food for the horses and cattle. At night these beds above described were let down, and served as our soft couches. Selecting the widest-looking plank I could find in the very dim light, I hoisted myself up onto the board, using my knapsack as a pillow and my mackintosh as a blanket. I spent a night of the most acute agony, only to be realized by those trying it or placed in the same predicament — a night of one continued attempt at elaborate balancing on a board.

The cold was intense, and I began seriously to give up all hope of ever getting warm again. I hadn't seen any oranges yet, or hot sun either, both being my idea of Italy.

About two o'clock in the morning, I was rudely thrown to the floor by a violent rocking of the ship. A thought flashed through

Genoese Kitchen.

me that we were either sinking or out in a terrible storm. The engine stopped, and I ran on deck, to find that the cattle, tired of standing still so long and in such close quarters, had moved forward and back as cattle will when tired or impatient, until the motion became steady and of sufficient force to influence the ship itself, so that she rocked violently from side to side, and at every lurch became

worse and worse. The officers became very excited. Something had to be done. For a moment they thought seriously of shooting the cattle, till one old sailor suggested a scheme whereby the crew got a mass of the creatures tied to one side of the ship to cross-counter the motion of the others. This was brought to pass by a great deal of necessary clubbing with marlin-spikes and cord-wood, and the ship was brought gradually to an even keel. The engines started, and I went back to my bed once more. Hardly had I gone into a doze when I was again disturbed, this time by the ship's gong ringing at five o'clock for breakfast. Breakfast! This repast consisted merely of one little cup of black coffee without sugar or milk, and not a blessed morsel until ten o'clock. I kept body and soul together by nibbling my bologna.

At last, at ten o'clock, according to orders, I filed up with the soldiers to the kitchen or galley, where I was presented with a tin

Waiting for a Boat.

plate, spoon, tin bowl and cup. With these I was complete in dishes. I had to return these utensils at the end of the voyage. When my turn came I had my cup filled with Chianti wine, and my tin bowl with a compound mixture of macaroni, beef, greens, crackers and hot water (the last-named very prominent). Then, with a ship's biscuit and a morsel of cheese on top, I made my way, balancing my supplies on my arm, to my favorite coil of rope. There I ate the mixture with that gusto known only to the Italian — and myself.

At six o'clock I had a dose of nearly the same *menu*. Bed at nine again. I was informed at the office in Genoa that the trip to Naples was two days and a night. In reality, it took us three days and

I and my bologna.

three nights with perfectly calm sea and favoring breezes. At Leghorn, where we stopped, I got permission, at my own risk, to get off and try to see Pisa. The captain informed me that the vessel only stayed at Leghorn four hours, and that I must be back promptly, as he could not wait a second for any third-class passenger. Anything was better than remaining aboard, so, getting myself dropped over the ship's side into a dug-out, I pointed to Leghorn, or Livorno, as they call it, and told my boatman to row me "subito." The distance was a long one, and took up fully half-an-hour. About a stone's throw from the landing, the boatman stopped rowing and demanded "due lire." Now, as I had made an elaborate bargain with him to row me for one, I was not going to be "bamboozled" so easily. I got properly enraged at his outrageous imposition, and

ordered him to land me immediately. He refused, and, resting on his oars, quietly awaited developments. I saw that nothing could be done, as the wretched scamp had me at a big disadvantage, so ordered him to row me back to the ship. This he started to do. Then, as the "bluff" didn't seem to work, and my time was getting greatly limited, I gave in on a compromise of one and a half lires. I had also great difficulty in finding the railroad station from whence the trains departed for Pisa, so that all this lost time had practically spoiled my little excursion.

Much disappointed, I looked over the town with its coral and straw hats. I called upon the consul, who was very polite and charming, and who gave me a very long and very strong cheroot to smoke. Then, allowing myself a quarter of an hour, with the risk of having the price of being taken back to my ship raised to three or five lires, I walked to the landing to find my grinning oarsman ready to take me back without further extortion. He asked me how I had enjoyed Pisa. I didn't deign to reply.

There was the "*Magesta*" lying quietly at anchor, with swarms of little dug-outs crowding around, all trying to sell herrings and wine to the hungry passengers looking over her sides. I was finally put aboard, and only to find that the wretched vessel did not sail for four mortal hours after the time the captain said she would.

Burning rage o'ercame me, and, as the winds blew cold and chilly over the Livornian hills, I felt as if it were indeed a cold day for me. At last we were off again. I went through the same routine for the rest of the trip. Why I didn't die of cold, hunger, dirt and privation is a thing I can't explain. Perhaps it was the novelty of the situation that kept me up, or that in it all there was something so droll and curious. Often, in the middle of the night, I would burst out into a hearty laugh, while the snoring *gens d'armes*, the lowing cattle, and the neighing horses, mixed up with a faint odor of macaroni, gave a sort of grim humor to it all.

What made it to me a pleasant memory was that when we finally arrived in the Bay of Naples by the light of the cold moon, there was the beautiful city, with its rows above rows of brilliant lights, while high in the clouds sat that grand old furnace, "Vesuve," smoking and flashing away.

The sailors and passengers then, and then only, produced their guitars and mandolins, and with the "Funiculi" and "Addi Napoli" (which seemed a trifle inconsistent to me) played and sang in that

An Italian "Saturday Night."

glorious night with a sort of inborn genius which the Italian peasant, untutored and uncultivated, alone can call forth with such soothing effects. It made up to me for a great deal that I had undergone. I then, on the next morning (as no one was allowed to leave the ship that night), bade good-by to some officers who had been kind to me, and passed the custom-house; then, throwing myself into a carriage, was driven to the Hotel Riviera, where for the next thirty-six hours I gave myself up to the joys of well-earned sleep, Pear's soap and the Italian bath-tub. F. L. V. Hoppin.

[To be continued.]

The Illustrations

[Contributors are requested to send with their drawings full and adequate descriptions of the buildings, including a statement of cost.]

CLOISTER IN THE CAMPO SANTO, GENOA, ITALY.

[Gelatine Print, issued only with the Imperial Edition.]

See "An Architectural Knockabout," elsewhere in this issue.

CHURCH OF OUR SAVIOUR, ROSLINDALE, MASS. MR. C. H. BLACKALL, ARCHITECT, BOSTON, MASS.

THE church is being built entirely of wood, the wall being covered with shingles carried down below the sill, outside the stone-work, to the grade, so that very little underpinning will be visible. The main room is to seat about 230, and the Sunday School room 150. The main trusses of the church are to be a combination of the hammer-beam and the scissors forms, the timbers being quite heavy and roughly hewn. There will be no rafters, heavy purlins six feet apart, supporting the roofing-boards of 1½ inch spruce plank, which will be left rough, with a sawn surface showing inside of the church. The walls will be sheathed to a height of six feet, and rough-plastered above. The windows are to be filled with cathedral glass in plain graded yellow tones. It is proposed to stain all the interior woodwork quite dark and bronze the entire walls and ceiling of the chancel. The total cost will be in the neighborhood of $7,000.

Entrance of OaKshade. Mr Whorter Residence
Oswego. N.Y. designed & built by G. H. Mr Whorter Esq. 1888.

A MODERN PALACE, GENOA, ITALY.

See "An Architectural Knockabout," elsewhere in this issue.

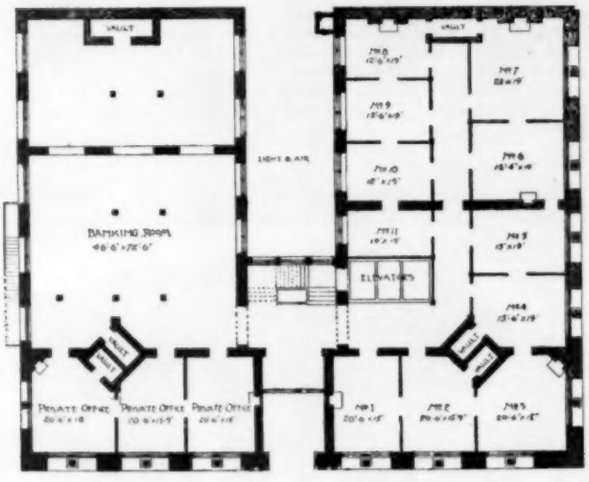
THE CAMPO SANTO, GENOA, ITALY.

See "An Architectural Knockabout," elsewhere in this issue.

THE BOSTON BUILDING, DENVER, COLO. MESSRS. ANDREWS & JAQUES, ARCHITECTS, BOSTON, MASS.

The building is to be built entirely of red Colorado sandstone, the lower three stories to be rock face and crandled above that.

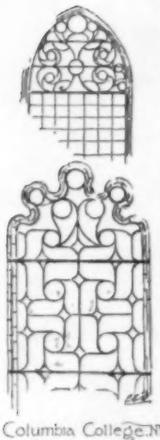
Finished in oak all through the interior; marble floor and wainscoting in the lower story. To be occupied entirely as an office building and to be of "mill construction" throughout, wire-lathed and plastered.



1st FLOOR PLAN.

2d 3d 4th 5th & 6th FLOOR PLANS.

WROUGHT-IRON GRILLES.

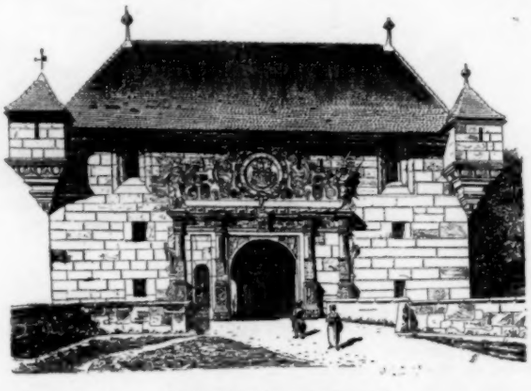


TWICE in our history blacksmithing, as a fine art, has flourished for a time, and then for long periods has lain dormant. At no time did it appear so moribund, however, as in the first decades of the nineteenth century. Its revival commenced with that of Pointed architure under Pugin and Scott, and was stimulated by Ruskin; but in a general way, it has lagged behind its fellow-crafts. But the situation has changed within the last half-dozen years, and we now run more risk of a redundant than of too stinted a production, for there is at present a fashion for wrought-iron, and it is applied to all kinds of objects hitherto made of brass or bronze. If this fashion is to be more than a passing wave, the smith and his designer must learn to distinguish what is original and good from what is mere vagary. Above all, with such a facile and easily abused material, he should learn to exercise restraint. The movement has been too rapid for thoughtful men or schools to develop, and no educated class of smiths as yet exist, and thus no craft is more in need of help and precept.

Of all objects in use, none rivals in utility the iron grille, whether used for protection or only for decorative effect. Nothing is less likely to be displaced by change of fashion, for iron affords in proportion to its bulk greater resisting power, and, therefore, more complete protection, than any other substance. Properly fixed window-guards give more security than shutters, and we are no longer confined, as we have been for almost half a century, to mere bars. Elegant forms can be produced within the reach of every one, and we can interpose between the window and the street beautiful objects which serve to screen our interiors from observation by day and to protect them by night.

The use of window-guards seem to have been known from the time of Solomon. The oldest actual specimens extant are those recovered in Pompeii, consisting of plain bars exactly like those still used in London areas, though we know that in Rome they were also of scale and lattice designs. Varied designs were used in Byzantine architecture, particularly by the Roman Gauls. The English were unsurpassed as smiths, and some beautiful specimens of grille-work tongs from the anvil while the iron was hot; while the mediæval Flemish work which superseded them was more the production of the file, saw and drill acting on iron cold. We have few specimens of window-grilles in this country, though as early as Henry III all the windows of the numerous palaces were thus protected, but in France a good many are yet extant. Great use was made of them in Italy and Germany, and exquisite specimens, both of Mediæval and Renaissance periods, are preserved in our National Museum at South Kensington. But in these, as in all other specimens of iron-work, Spain of the sixteenth century far excelled every nation. Spanish window-guards are *chefs-d'œuvre*, simple and dignified in design, yet with refined and elaborate detail, light of aspect, yet of massive strength, furnishing endless designs which deserve our most careful study, though to reproduce them with the same chiselled and embossed delicacy of detail would cost more time than any smith would prudently spend. The distinguishing character of Spanish grille-work is that the body of the design is full of repose, while the scrolly ornament is concentrated where it least impedes the vision. In the revival of blacksmith's work that followed the Restoration of Charles II — in consequence, it must be owned, of his partiality for the French fashions of Louis XIV, who encouraged blacksmithing in France with his wonted magnificence — window-grilles were only occasionally used, but some most exquisite specimens by a French smith can be seen in St. Paul's Cathedral. Examples are met with here and there as late as the time of the brothers Adam, when they were commonly inserted in the fan-lights of street-doors and on stair-case-windows. — *Journal of the Society of Arts.*

VITTORIA COLONNA.



Chateau de Tubingen, Germany.

MODERN criticism has adopted strange processes of study. In place of fathoming the work of a great man, researches are made into the record of his life. His clothes are stripped from him; he is analyzed on all sides; he is surprised as he steps out of bed; he is spied on in moments of the utmost privacy, and all this is called psychological study. Formerly it was enough to know that Michael Angelo had painted the Sistine Chapel, and that Lord Byron was the author of "*Childe Harold.*" Now it appears that in order to seize upon the marrow of the poetry of Byron, and to comprehend pictorially the drama of the "Last Judgment," it is absolutely necessary to know whether Lord Byron preferred port or Bordeaux, and whether Michael Angelo slept on his right or upon his left side. Italy has not escaped this rage for retrospective investigation, which, in place of bearing upon the creations of the masters, points only at their private life. The grand Italian poets of the last period, Foscolo, Monti, Leopardi, Manzoni have inspired during the last ten years a number of volumes large enough to fill several libraries. This has not augmented by a single line the poems left by these distinguished writers, and has added no beauty to their poems. In revenge the reputations of some of them have suffered to a considerable extent. Foscolo, for instance, who was considered the Tyrtæus of Italian independence, issues from this posthumous examination in a much diminished form, and has the air of a sufficiently villianous fellow who, not content with courting several women at the same time and cruelly betraying them, frequently borrowed from them, and was never disturbed at living at

their expense. Vittoria Colonna, the faithful and tender friend of Michael Angelo Buonarotti, has also drawn upon herself the converging magnifying-glasses of the analysts, who, within a short time, have written several books about her. Here researches were not wholly superfluous, for the physionomy of this patrician beloved by the muses, who had had the rare fortune to unite her name by a bond of affection to that of the greatest artist of the Renaissance, stood out with scant distinctness in the commonly-known chronicles, and only presented vague and ill-distinguished contours. To-day the outlines of this figure are better determined, and we can measure with more certainty the amplitude of her talent and the part which she played in the last years of the life of Michael Angelo.

Vittoria Colonna belonged to that patrician family whose fierce pride held in check at Rome the whole power of the popes — a family whose rivalry with the Orsini provoked in the States of the Church long civil wars. She was born in 1490, and had received a very thorough education, for, strange to say, in that time of relative barbarism, the learned did not hold that woman should be kept in a state of servile ignorance, and Julian de' Medici, apropos of the education of woman, said that she ought to be versed in literature, science and the arts, so as to be able to talk fluently on these subjects. The Italian woman of the fifteenth century (we here speak, of course, of women belonging to the upper classes) was, therefore, of a rare type of delicacy and learning; and Vittoria Colonna was above all the glory of that century, which so many other illustrious females also honored. At nineteen years of age she was married to the Marquis of Pescara, a descendant from a Spanish family who settled in Italy in the reign of Alfonzo the Magnificent. It was a *mariage de convenance*, arranged long before by King Ferrand II, who desired to effect by this alliance the definite attaching to himself of Fabricio Colonna, father of the *fiancée*, who, having been for some time a partisan of the French, had at length embraced the Spanish cause. But Vittoria possessed a mind so copiously nourished by the sentimentality of Petrarch and the poems of chivalry that she loved her husband as if he were a hero of romance, though, in truth, he hardly deserved it. He was a good soldier, courageous and valiant, but as a man he was absolutely despicable. He was wounded at the battle of Ravenna in 1512, where his conduct was admirable. Later he took Genoa by assault, and at Vico vanquished the Venetians, the allies of France. When the war broke out in 1521, between Francis I and Charles V, the Marquis of Pescara was invested with the command of the Imperial infantry, and in this capacity took possession of Milan and Pavia. The following year he vanquished the French at Bicocca, and by the capture of Pavia forced them to abandon Lombardy. At the battle of Pavia he gave proof of rare bravery, and in a letter to the Marquise, the Emperor Charles V acknowledged that he owed this brilliant victory to the zeal and talent of Pescara. It is at this time that took place the act which forever dishonored the life of this soldier. In spite of his promises, the Emperor was in no haste to reward his ally, as he had given him cause to expect, and the Duke of Milan, Ludovico Sforza, felt that the moment was propitious to beguile him into treachery. Morone, the Duke's chancellor, began secret negotiations with the Marquis of Pescara, with the object of making him discontented, and he, instead of rejecting these advances in disdain, entered into a conspiracy and made a pretence of being ready to commit the treason which was suggested to him. Then he denounced Morone to the Emperor. This denunciation brought about the imprisonment of the Duke's chancellor. Pescara, however, reaped no profit from his duplicity, for a short while after he died at the age of about thirty-six. Guicciardini, the great Italian historian, passes severe judgment on the Marquis, and rightly considers such a man unworthy of esteem.

Left a widow at the age of thirty-five, Vittoria Colonna abandoned herself to profound despair, although she did not approve the conduct of her husband towards Morone. Her sense of right was revolted at the idea of this piece of treachery, so little conformable to the chivalrous idea held in great honor in the world where she had grown up. Her chagrin is the more incomprehensible that even in the matter of conjugal affection the Marquis had behaved very badly, and had loved madly, amongst others, a maid of honor of the family of Gonzagues, at Mantua; but it appears that Vittoria was ignorant of this culpable *liaison*, and that she could not believe that the man she mourned had done her any injury. To console her grief, she first withdrew to a convent at Viterbo, and afterwards to the Convent of San Silvestro, at Rome. It appears that she had at one moment the intention of devoting herself to the life of the convent, but the Pope opposed this idea with much energy, and forbade the nuns to offer her hospitality or to favor these wishes. It is at this time that she abandoned herself with energy to the mania of making verses. I do not share the enthusiasm of some of her admirers, who would rank her poetry amongst the *chefs-d'œuvre* of the Italian language. These poems lack both sincerity and inspiration. They very visibly bear the imprint of Petrarchian mould in which they have been cast. Vittoria's imagination was, moreover, very poor, and her inspirations always roll with a monotonous uniformity about a conventional similitude, as that of Petrarch remained circumscribed within the calembourg furnished by the name of Laura, his beloved, and the tree which symbolizes Glory. In Vittoria's sonnets there is always introduced a ship beaten by a storm which struggles furiously against the waves and sea. Nevertheless, this obstinate inclination toward literature had rendered the widow of Pescara very celebrated, and, when in 1535 Charles V passed through Rome, after the campaign in Tunis, the only two patricians he deigned to pay his homage to were Jeanne of Aragon and Vittoria Colonna.

Rear View of the Cathedral at Padua.

The Marquise was always careful to surround herself with men of the highest education of the time, and formed about herself a *salon* of literary and artistic celebrities, in the midst of which she sparkled by her beauty as much as by her wit. Directly after her marriage, when she used to pass a great portion of the year at the Villa Pietralba at Naples, or in her château at Ischia, she brought into close intimacy with herself the fine flower of literary and political society, of which, amongst others, Zanazzovo, the Italian Moliere, Monseigneur Giovio, the historian, and Galeazzo di Tarsia, the poet, formed a part. The latter conceived a lively passion for her, which exhaled in his flowing sonnets, but she avoided his compromising attentions, and Tarsia, reduced to despair, exiled himself to France, whence he returned eleven years afterwards without having yet extinguished his flame. Later, Vittoria passed in this way some months at the Palazzo Marino, and there she counted amongst her satellites the Cardinal Pietro Bembo, the literary epicurean, and Ludivico Ariosto, author of the greatest poem of chivalry which figures in the Italian repertory. Little by little her fame spread through all Italy, and there was no well-read man who did not attempt to celebrate her praises. There is mentioned amongst these panegyrists, besides those already named, the poet Berni, Annibal Caro, translator of the Æneid, Tressin and Monseigneur della Casa. Aretino also held correspondence with her, and, faithful to his habit, which was to speculate upon everything and everybody, did not fail to take advantage of this friendship to obtain from the Marquise an enormous sum of silver, which, however, did not prevent him from covering her with epigrammatic vituperation later.

In 1537, Vittoria Colonna was at the Court of Ferrara. It appears that her relations with the Duchess Isabella of Este were tinged with a certain coldness, but in general she was much flattered and loved at this court, and, when Monseigneur Giberti was charged by the Gonzagues to influence her to go to Mantua, he himself writes that he hardly escaped being stoned for accepting the mission of removing from Ferrara so distinguished a woman; but the climate of the country was not agreeable to her, and, in spite of the cajoleries which they lavished on her, she was forced to abandon it. Three years afterwards she was again at Rome, where she made a friend of Juliet Gonzague, who had the reputation of being the most beautiful woman of her time, and whose reputation reached as far as the

Emperor Solomon II, who ordered Adrien Barbarossa to carry her away from Fondi, where she was dwelling at the time. She was saved almost miraculously by one of her servants, who took her in his arms and, almost naked as she was, escaped through a window with her. The chronicler adds that Juliet put this servant to death afterwards in order that he might not boast that he had touched her flesh. This same Juliet died in a convent at Naples in the odor of heresy [*sic*]. It was about this time that Vittoria, who had fallen, since the death of her husband, into an almost superstitious pietism, formed relations with some ecclesiastics accused of inclining toward the Reformation, and amongst others, with the famous Ochino, who, persecuted by the tribunal of the Holy Inquisition, went to die to Geneva, and with Contarini, a delegate to the Diet of Ratisbon, and the Cardinal Reginaldo Polo, who had a finger in all attempts which had for end and aim to arrange a concordat between the Church of Rome and the new German ideas, an arrangement which would have avoided, perhaps, the foundation of a Protestant communion. The Marquise interested herself in these religious agitations, and brought to it the ardent devotion of her feminine character and her Christian spirit; but when the rupture was declared between Rome and Germany the Inquisition opened proceedings against her, accusing her of having had relations with heretics, and she narrowly escaped being persecuted.

It was on the morrow of this catastrophe that she met for the first time Michael Angelo, who was to be the last and, perhaps, the most vivid love of her life. She had already reached a ripe age, while Buonarotti was on the threshold of old age. This is enough to give the lie to the unpleasant and ridiculous tales that certain historians have embroidered about this *liaison*. Nevertheless, although purely intellectual, this commerce between the poet and the artist was none the less very intimate, and closely followed up to such a point that Michael Angelo, having paid a visit to his friend on a certain day, when she was listening at the Church of San Silvestro to the reading of the epistle of St. Paul by Father Ambrose of Sienna, the latter said to the Marquise as he finished: "My opinion is that you listen more willingly to the sermons of Michael Angelo than to those of St. Paul."

The admiration which Vittoria had for Michael Angelo had no limit, and we find it expressed in all her conversations which the historians have recorded. On his side, Michael Angelo composed for her sonnets and sang madrigals, of which a large number have survived.

In 1540 a crisis occurred which, for the moment, separated the two friends. Paul III, an enemy of the Colonnas, being provoked by the reprisals on their part against the pontifical authority, Vittoria invoked the aid of Charles V to put an end to the conflict; but the Pope showed himself immovable, and hostilities broke out. Then she retired to Orvieto, and thence went to Viterbo. During her absence she composed a great number of poems, which she regularly sent to Michael Angelo, who showed them to his friends and preserved them religiously. At Viterbo she fell sick; but she said that she must die under the eyes of him who had surrounded with sweet affection the last years of her life, and whose genius added the more brilliance to her literary glory. Returned to Rome, she sought her bed once more, and on the 25th of February, 1546, drew her last sigh, consoled at this supreme moment by Cardinal Polo and by Michael Angelo, who, before quitting her forever, kneeled beside her death-bed, and, all trembling, taking her hand, already growing cold in death, pressed a kiss of adieu upon it, the first and last that he had ever dared to give to this pure and virtuous woman whom he had so much loved.

H. Mereu.

SAFE BUILDING.[1]—XXXI.

IN the pneumatic or Bessemer process the carbon is entirely removed from the pig-iron by oxidation and then the necessary amount of carbon to produce the desired quality of steel is afterwards re-introduced. This seemingly roundabout method is adopted, because it would be impossible otherwise to determine promptly or exactly enough when the decarbonization should cease, the entire removal of all the carbon taking only some twenty minutes. It is easy to determine, however, when the carbon, silicon, etc., are completely oxidized, and then to introduce carbon in a known proportion which is done by adding "spiegeleisen" as hereafter mentioned. It would not be so easy, however, otherwise to know at just what point sufficient carbon was removed.

Bessemer Process.

The above operations are conducted in an egg-shaped vessel open on top, known as the "converter," hung like a cannon on "trunnions," into which melted pig-iron is poured from a cupola furnace, blast or wind furnace. This converter has a perforated lining in the bottom through which a forced vertical blast, at a pressure of 20 to 25 pounds per square inch, enters and bubbles up through the molten metal. The action of this blast is distinctly oxidizing, the oxygen in the air seeming to first combine with the silicon in the pig, forming silica or quartz, which rises as slag to the top. The manganese and carbon in the pig are next consumed, the carbon passing off in gaseous combination with the oxygen and being thus eliminated. By the changing appearance of the "flame," which at first is of a bright yellow appearance but very turbulent and full of flying sparks, then settles to a more steady and clearer flame of pink or amethyst color, and finally settles down and disappears almost completely from the mouth of the converter, the various stages and final total elimination of the carbon are known, and at the end the blast is shut off. The metal in the converter is at this moment approximately pure iron, slightly oxidized or "burnt," and is in a spongy friable mass and non-malleable. Molten "spiegeleisen" is then poured in and its addition is accompanied by a violent boiling reaction, accompanied by a reappearance of the flame at the mouth of the converter. This Spiegeleisen is simply a German pig-iron very high in carbon and manganese of known proportions, and is so-called from its mirror-like, shiny, crystallized formation.

Condition known by flame.

The object of the carbon in this addition is to turn the pure iron to steel; the object of the manganese is to take up any excess of oxygen in the melted iron by forming oxides of manganese, thus preventing the steel from being what is known as "red short" or burned.

This mixture of decarbonized iron and spiegel is allowed to rest in the converter for a short time or is sometimes mechanically stirred up and then, after pouring off the slag, the contents of the converter are tipped into a ladle swinging radially on a crane-arm over a semi-circular row of ingot moulds into which the melted steel is poured from an opening in the bottom of the ladle controlled by a plug. These ingots weigh 4 to 5 tons each: they are allowed to cool as they are in the mould, or else in a "soaking pit," which is simply a device for allowing them to cool slowly on the annealing principle; this slower cooling improves the quality of the product by more thoroughly eliminating the included gases and avoiding the internal strains due to otherwise too-rapid cooling. But, as already remarked, where the blooming mill is close at hand, the ingots are not allowed to cool, but are run hot to the rollers.

Casting of Ingots.

The lining of the converter is usually "ganister" (silicious sand) which is of an acid (silicle) reaction and gives the name of "Acid process" to that usually adopted in this country. In England and on the Continent and presently in Alabama, where ores run too high in phosphorous and sulphur to permit of their successful use in the Bessemer process, the acid lining is sometimes replaced with a basic or alkaline lining made from dolomite, etc. The lime and magnesia in this lining unite with the sulphur and phosphorous in the pig forming a fusible slag, thus rendering their elimination possible. This expense is not required, however, with most pig made from American ores as may be inferred from the fact that it does not represent the ordinary practice in this country.

It is not necessary within these limits to explain the "Clapp-Griffiths" process, about the merits of which so much controversy has been had lately, further than to state that it is an intended modification of the Bessemer process, by which it is hoped to modify and cheapen it to the point of rendering it adaptable to plants of small capacity, and also to secure a better control over the quality and *homogeneity* of the product desired.

Clapp-Griffiths Process.

Taking all things together, however, the superiority to-day for structural iron seems to lie with steel metal made under the Open Hearth process, (first introduced into the country by the New Jersey Steel and Iron Co.), because the results desired are under more perfect and intimate control. Ample opportunity is afforded at various stages of the process to test and duly correct the quality of the product, and a greater *uniformity* of the product itself seems to be obtained than with the other processes. For railway bars, Bessemer steel has at present largely the greater production being also cheaper and is undoubtedly well enough adapted to it, but for structural purposes, such as ships, bridges, roofs and girders, the best opinion today seems to incline to the preferment of the Open Hearth product on account of its superior uniformity.

But, as already emphasized several times, very little is really known to-day of the properties of steel and new facts are coming to light every day. Its manufacture and determination are undoubtedly still in their development, and though events point strongly to steel becoming the metal of the near future, there exists among many reasonably conservative men, a wide and well-grounded distrust of its use in the higher engineering or architectural structures, on account of its mysterious behavior, and frequent erratic and inexplicable failures. It should never be used, except after the most rigid and frequent tests, which of course add greatly to the expense attendant on its use.

Use of Steel not yet commendable.

Except that being cast in large masses requiring very heavy preliminary "breaking-down" or "blooming" mills to adapt it to the finishing strains, and that usually it is not piled, its subsequent manipulation to produce the ordinary structural forms is very similar to that already described for wrought-iron.

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[1] Continued from page 42, No. 709.

The ingot, while hot, is run to the blooming-mill, and there run through rollers to form the "blooms," which are each of the necessary weight in one piece, to make a whole beam or other shape. The cross-section of the bloom is about 3 inches by 9 inches, the length depending on the weight and length of beam or other shape desired, usually from 5 feet to 30 feet, the latter weighing a little over a ton each. These blooms occupy in the rolling of steel the corresponding place to the piled muck-bar or other iron in the rolling of iron.

Rolling of Steel Bloom.

The bloom is heated in a furnace and run through rollers, which gradually shape it to its final section, the same as with wrought-iron; the only difference being that the bloom is not heated to the same high temperature as iron, and, therefore, its resistance to squeezing when passing through the rolls is very much greater than with iron. Steel plants are, therefore, not only very expensive, but the amount of breakage in housings and rolls is very great.

The Phœnix Co. are preparing to make steel stock of similar size as from the iron muck-bars, and to pile them similarly. This will probably be done in time by all the mills, and may lead to a considerable saving in the expense of replacing broken machinery.

The writer understands that at present the Bessemer process is employed at the Homestead Works in Pittsburgh (Carnegie, Phipps & Co.); and by the Columbia Iron and Steel Co., of Uniontown, Pa.; and by the North Chicago Rolling-Mill Co., of Chicago; and that ingots made by the Open Hearth process are bought and used by the Passaic Rolling Mills, of Paterson, N. J., and by the New Jersey Steel and Iron Works, of Trenton, N. J.; and that the latter also buy and use ingots made by the Bessemer process.

Processes used by Mills.

That the Clapp-Griffiths (modified Bessemer) process is used by the Pottsville Iron & Steel Co., of Pottsville, Pa.

The Siemens-Martin (Open Hearth) process is used by the Phœnix Iron Co., at Phœnixville, Pa., who roll their ingots; and that the works now building for the Pencoyd Iron Works at Pencoyd, Pa., are also for the Open Hearth process, but that they intend to hammer their ingots.

These eight mills embrace all the leading mills in the United States where structural iron and steel of I-beam, channel, angle, deck-beam or tee-shapes are rolled.

A very cheap and inferior grade of steel, known as "puddled steel," is made by stopping the puddling of pig-iron before all the carbon is removed.

Puddled Steel.

Many attempts have been made to establish exact lines of demarcation between wrought-iron, steel and cast-iron, but none are very satisfactory, though a few are here given.

Dr. Percy says if the iron be pure, contain *no* carbon, it is wrought-iron (though practically wrought-iron contains some 0,25 per cent of carbon). In this condition the iron is soft, tenacious, weldable, but not fusible.

Classification of Irons and Steel.

If the iron contains *some* carbon, from 0,15 per cent to 1,8 per cent, it is steel, the different kinds of steel varying according to the quantity of carbon; the different steels being accordingly more or less elastic, malleable, forgeable, fusible and capable of hardening and tempering.

If the iron contains *much* carbon, from 2 per cent to 6 per cent, it is cast-iron and is hard, brittle and fusible, but it is neither weldable nor forgeable.

The following (Table XXVIII) appeared originally in "*Bauermann's Metallurgy.*"[1]

TABLE XXVIII.

CLASSIFICATION OF IRONS AND STEELS.

Name.	Percentage of Carbon.	Properties.
1. Malleable iron.	0,25	Is not sensibly hardened by sudden cooling.
2. Steely iron.	0,35	Can be slightly hardened by quenching.
3. Steel.	0,50	Gives sparks with a flint when hardened.
4. Steel.	1,00 to 1,50	Limits for steel of maximum hardness and tenacity.
5. Steel.	1,75	Superior limit of welding steel.
6. Steel.	1,80	Very hard cast steel, forging with great difficulty.
7. Steel.	1,90	Not malleable hot.
8. Cast-iron.	2,00	Lower limits of cast-iron, cannot be hammered.
9. Cast-iron.	6,00	Highest carburetted compound obtainable.

Table XXVIII does not, however, agree with what is called steel in American practice. Steel with 0,12 per cent of carbon is considered "mild steel," and with 0,36 per cent of carbon "hard steel." The former is used for structural purposes. Steel with more than 0,12 per cent of carbon will not stand the tests for the Government cruisers.

LOUIS DECOPPET BERG.

[To be continued.]

[1] Copied from "*Notes on Building Construction.*"

COMMUNICATIONS.

[*The editors cannot pay attention to demands of correspondents who forget to give their names and addresses as guaranty of good faith; nor do they hold themselves responsible for opinions expressed by their correspondents.*]

INCREASING THE MEMBERSHIP OF THE PRESENT ARCHITECTURAL SOCIETIES.

CHICAGO, ILL., July 26, 1889.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Dear Sirs,— I fail to see the force of your arguments in a recent editorial on the danger of admitting members to the American Institute or the Western Association of Architects prior to consolidation. There is no reason why either society should be more lax in its scrutiny of applicants than formerly. On the contrary, the very fact that we are to have a great and national association would lead the directors and members of both associations to be more critical in their examination of candidates.

It is very natural that there should be applicants for membership at this time. It has always been a source of satisfaction to me personally that, although one of the younger members of the profession, I was present at the organization of the Western Association of Architects, and had some share in the work of its first convention. The consolidated organization is, in reality, a new society, and it is both natural and proper that architects who are as yet members of no society should seek to take part in the first convention of the new organization, rather than come in after its close. As Mr. Bloor has remarked in a communication in the last number of your journal, one of the great advantages of the new organization will be its numbers, and large membership will give the society a correspondingly large income, which will enable it to do many things that a smaller organization could not accomplish.

Again, a society can exercise little influence upon those who are not members. Therefore, it should be the aim of the new Institute to secure the membership of every architect in the United States who has shown himself reasonably competent, and who is conducting his business in accordance with its ideas of professional honor. The Institute is not to be a club for the enjoyment of a few who consider themselves the aristocracy of architecture, but it is to be a national organization, whose aim, according to Article 2 of the new Constitution, shall be "To unite in fellowship the architects of this continent, and to combine their efforts so as to promote the artistic, scientific and practical efficiency of the profession." There can be nothing improper or undignified in urging all honorable and competent architects to join such an association, and of taking advantage of occasions of exceptional interest to awaken the enthusiasm of architects on the subject of the general welfare of the profession.

The consolidation of the two existing societies will be the greatest architectural event that has occurred for some years, and it would be neglecting a great opportunity if the officers of both societies should fail to take advantage of this occasion to bring into membership of the new body those architects whose assistance would be of value.

I remain, very respectfully,

NORMAND S. PATTON, *Sec'y* W. A. A.

NOTES AND CLIPPINGS.

FLOOR-DEAFENING. — The communication made by Sir H. Roscoe, F. R. S., on the effect of floor-deafening on the sanitary condition of dwelling-houses, to the Royal Society, will not be a surprise to those who know the materials used by some builders for the purpose of pugging floors. Miss Etta Johnstone, University College, Dundee, and Prof. Thomas Carnelly, have found that instead of coarse mortar and smith's ashes, a mixture of a more questionable nature is used for deafening. An analysis of a number of samples from various classes of houses in Dundee have shown that the deafening contains large quantities of nitrogenous organic matter and chlorides in the old and poorer class of houses; in many cases the smell is very objectionable. That taken from floors in middle-class houses is practically free from nitrogenous organic matter and chlorides, and from any disagreeable smell. The report observes (1) that the cinders which form the bulk of the deafening in better-class houses are probably of good quality, owing to their being obtained from a non-contaminated source, whereas in the poorer class of houses ash-pit refuse and other inferior materials are used. (2) The carpets in the superior houses are not usually lifted oftener than twice a year, and, of course, the floors can only be washed at those times, so that the necessary condition of moisture for the growth of micro-organisms is not present to the same extent as in lower-class houses; while, at the same time, the carpet will act as a partial filter to micro-organisms arising from the deafening material. In the poorer class of houses the floor-boards are open-jointed, so that when the floor is washed the water can trickle down to the material, and all the household operations, as washing, cooking, nursing, etc., are carried on in one or two apartments, and the spilling of dirty water, slops, etc., cause percolation into the deafening. The air is also moist and warm. The results of the analyses show clearly that the one and two roomed houses are the worst in this respect; the highest proportion of micro-organisms being found in them, and the death-rate increases and the

meanage diminishes as we pass from the many-roomed to the one-roomed house; also that the deafening material is a source of contamination of the air in these dwellings, in that it furnishes a suitable medium for the growth of organisms, and gives off fetid gases when the necessary factors are present. We have repeatedly seen very doubtful-looking straw mixed with mortar. — *Building News.*

The Rebuilding of Naples. — The city of Naples, in Italy, began house-cleaning July 1, on a scale never before paralleled in the history of municipalities in any part of the globe. The plans contemplate the demolition of 17,000 houses and sixty-two churches in the most thickly-settled and most squalid parts of the city, where the narrow streets filled with perennial filth breed pestilence and death. It is proposed to erect in their stead well-built houses and to lay out fine broad streets. Naples is the most thickly populated city in Europe and the quarter to be thus renovated contains now a population of 108,000 or 600 to the acre. It is proposed to reduce this population one-half. All the people now residing in these slums have received notice to quit, and when the work has been completed the new buildings will probably have an entirely new set of occupants. A new street, a mile and a half long and ninety feet wide, which is twice the width of any existing street in Naples, is to be run through the district now temporarily depopulated. The cost of this immense improvement will be enormous and is to be borne largely by the Italian Government. The work to be done involves the destruction of 144 old streets and the widening of 127 others, the total or partial destruction of fifty-six *fondaci* or slums and 527 isolated groups of houses. The payments which will have to be made to the owners of the houses to be torn down for their appraised value, will alone amount to £3,750,000. Although the public inauguration of this enterprise took place over a week ago, when King Humbert and his son, the Prince of Naples, went from Rome to take part in the ceremonies attending it, the real work only began July 1, when 12,000 laborers were set to work tearing down the filthy old rookeries in the doomed quarter. This improvement, it is expected, will take four years to complete. The improvements have been in contemplation ever since the great cholera epidemic of 1884, which so thoroughly demonstrated their necessity, but it was not until two months ago that the Italian Parliament passed a bill authorizing the work. — *Philadelphia Press.*

Scientific Use of Eiffel's Tower. — At a recent meeting of the French Academy of Sciences, M. Janssen, the well-known astronomer, read a paper on some observations he had made to test the truth of the received statement that oxygen rays in the solar spectrum are due to the presence of that substance in the sun. It was known that some of these rays are due to the earth's atmosphere, but it was uncertain whether others of them might not be due to the solar atmosphere. One method of testing the question is to ascend a high mountain and observe the diminution of intensity in these rays as one proceeds, thus learning whether or not they are all terrestrial. Another plan is to analyze the rays from a powerful light giving a continuous spectrum. The light should be placed at a distance equivalent to the thickness of the earth's atmosphere in its action on the spectrum. The Eiffel Tower, with its powerful electric lamp, offered to M. Janssen these conditions. It is situated about seventy-seven hundred metres from his observatory, and the intervening air is practically equivalent to the thickness of the atmosphere toward the zenith. A collecting lens was employed to give the spectrum of the Eiffel light an intensity equivalent to that of the solar spectrum in the same analyzer. The effect was vivid, and the spectral field extended beyond A, while the group B was as bright as that from the meridian sun in summer. No oxygen band was visible, and M. Janssen concludes that the bands obey other laws than the rays. In fact, while for the rays it appears not to matter whether one employs a thickness of gas at constant density or a thickness equivalent in weight but of variable density; for the bands, on the contrary, the absorption taking place according to the square of the density, calculation shows that at the surface of the ground an atmospheric thickness of more than fifty kilometres is necessary to produce them. M. Janssen considers his experiment an approximation, but so far as it goes it tends to prove that the oxygen rays of the solar spectrum are purely terrestrial. Further experiments will, however, be attempted. — *London Times.*

A Hanging Road near Lucerne. — The cantonal authorities of the districts around Mount Pilatus have under consideration a proposal for the construction of a novel kind of road which has been submitted to them by M. Leonardo Torres, of Santander, through the Central Government at Berne. This road would connect the so-called Oberhaupt, or highest point of Pilatus, with the Klimsenhorn. The object would be to make the ascent of the mountain easier on the northern side, and to shorten the ascent of the tourists coming from Hergiswyl. The difference in level between the two points is set down at 194 metres; the distance between them at 465 metres. The road apparatus (for such it must be called) would consist of six wire cables, quite independent of one another, on which six light pulley wheels will move, and from these wheels a small omnibus capable of carrying eight persons will hang. The omnibus will be drawn by a rope attached to a steam engine to be placed on the Oberhaupt, near the Bellevue Hotel. — *Invention.*

Curious if True. — Another strange circumstance is the difference in the inside measurement of walls. An architect denies it, but the carpenters find the brick lays right. Suppose two walls, carried 110 feet high, 100 feet apart, should be erected. According to the plumb bob each wall is perpendicular and as straight as a die, but it will take three inches more of lumber to build the roof than it did the first floor. Actually the walls are three inches wider on the inside at the top than at the ground-line, and contractors for high buildings also figure for it. Still, both walls are built straight skyward. The explanation is simple: The earth is round, the walls were started 100 feet apart, each built 110 feet high and straight. They are each on a different portion of the globe, and are, therefore, erected on entirely independent angles, carrying them three inches apart, with no danger of falling, because they are held by gravitation. — *Pittsburgh Despatch.*

TRADE SURVEYS

Before referring to more important and significant matters, it might be well to refer to the fact that a deep and general organized effort is being made by leading financial managers in railway circles to start a genuine stock-speculating boom. Those who are most interested in the manipulation of stocks on a large scale have been anxiously awaiting the opportunity for many months. Circumstances are now coöperating to enable them to carry out their purpose, which is to draw the outside public into speculating in railway securities, old and new, known and unknown. The railway investments, which usually run from one hundred to two hundred millions per year, have recently dropped off, for a variety of causes, several of which have been pointed out heretofore. Capital has for some time been seeking more attractive modes of investment. These opportunities, however, at their best, are merely accidental. Railroad investments must be for the future the general method most acceptable for the investment of funds. London and New York manipulators are now coöperating, and, with the aid of some of the best-known names on this side, have at least started what they hope will eventuate in a general rush of the outside public for stocks which they have long held. In connection with this preliminary effort, for which success is by no means assured, the rumor is started that a financial stringency is gathering in the distance. Those whose interest it is to contradict such a rumor refer to the fact that within the past four years some two hundred millions of legal money have been injected into general circulation and which is now doing duty in the most profitable manner possible in the development of industrial and agricultural activity throughout the interior. The movement of the largest crops ever harvested will call for a larger supply of money in Western markets than has ever before gone that way. Considerable gold is still going abroad. Prices show a hardening tendency. A failure here and there presents some admonitory symptoms. These four points are used by the bear element to bolster up their side. In truth, neither side knows anything about the future. There are elements at work which will manifest themselves like the charge of an ambushed army at sunrise. The country's consumptive requirements are growing at a rate which even those who ought to be perfectly familiar with them will find surprising. Referring to evidence for the truth of this statement, we find it in the iron trade, which for six months past, in the language of the general iron reporter, has been dragging. Mr. Swank, of the American Iron and Steel Association, states that the production of crude-iron for the first six months of this year was the largest ever known; viz., 3,657,767 tons gross, as against 3,020,092 tons gross for the first half of last year. At the opening of the year the stocks of crude-iron were about one-half million tons, or 200,000 tons over the usual amount. Within the past three weeks, business of sufficient volume has been transacted in the various iron centres to reduce that surplus to the average amount. Further than that, the probable consumptive requirements that have loomed up within that time have not only assured iron-makers of continued activity for several months to come, but have induced a number of makers of iron to start their idle stacks.

If additional evidence of the incorrectness of the views of presumably wise men in trade and commerce is wanted, it can be found in the oversold condition of nearly all varieties of textile products. The one signal failure during the past few days is, in reality, a proof of the fact that the market is over rather than under sold, because the firm in question made lavish advances, often in excess of the value of the goods forwarded, thus showing their absolute confidence in the stability of the market. Taking Fall River as a typical centre, we find stocks there at a very low limit, considering the heavy production. The same is true of other centres of other products. Manufacturers in their anxiety to keep even with the market have fallen behind it, and the most intelligently-written market reports of textile journals show that there is an expanding demand for the better grades of nearly all lines. If there is any exception, it is in hosiery. If there is any backwardness shown in meeting these demands, it is because of unsettled conditions outside of trade requirements. As soon as the manufacturers of woolen goods know where they stand, they will know what to do. The makers of machinery are busy, and that is significant. The manufacturers of Southern plain cotton goods are introducing machinery for making finer products. The manufacturers of boots and shoes, instead of accumulating stocks as is their custom, are now simply working to demand, and, as a consequence, are obtaining a little wider margin But the tanners are complaining that they are not obtaining a share in the improvement, such as it is. Additional evidences of the mistakes of experts in their respective lines might be adduced; but it is sufficiently evident to all who are down in the ranks of trade, that for the next few months, at least, the producers will have their hands full. The iron-mills within the past few weeks have been filling up faster than they ever did before. The possible mistake that this encouraging condition of things may bring about is, that production may be stimulated to an undue degree. This little wave of revival should not be misunderstood or exaggerated. It may last only a few weeks and then depart; it may remain and increase. Its activity at this time is due to past conservatism. Its continuance will be assured by steadfastly adhering to the same policy. Among the talked-of combinations is a scheme to buy all the natural-gas producing territory of Ohio and Indiana. There is no serious difficulty in the way. A large coal-deal was entered into in Central Pennsylvania the other day, involving some two million dollars. The anthracite-coal trade is somewhat less active than a year ago among retailers, but the production of the mines is in excess of the output at the corresponding date last year. It is generally understood that an advance will be made September 1. The distribution of lumber from Southern and Northwestern points has not fallen off in the least, and the offerings of large buyers for winter supplies have not resulted in sales. The general policy of lumber dealers is to maintain prices where they are. Poplar has not recovered what it lost, and probably will not. Yellow pine and North Carolina sap have not weakened even in the face of very heavy shipments, because of the wider territory covered. Building operations show no signs of a falling off. In all the larger cities work is being pushed with accustomed earnestness. Prices for raw material are, for the most part, unchanged. Extensive building contracts are protected from fluctuations in values of material, contracts for material having been made some time ago.

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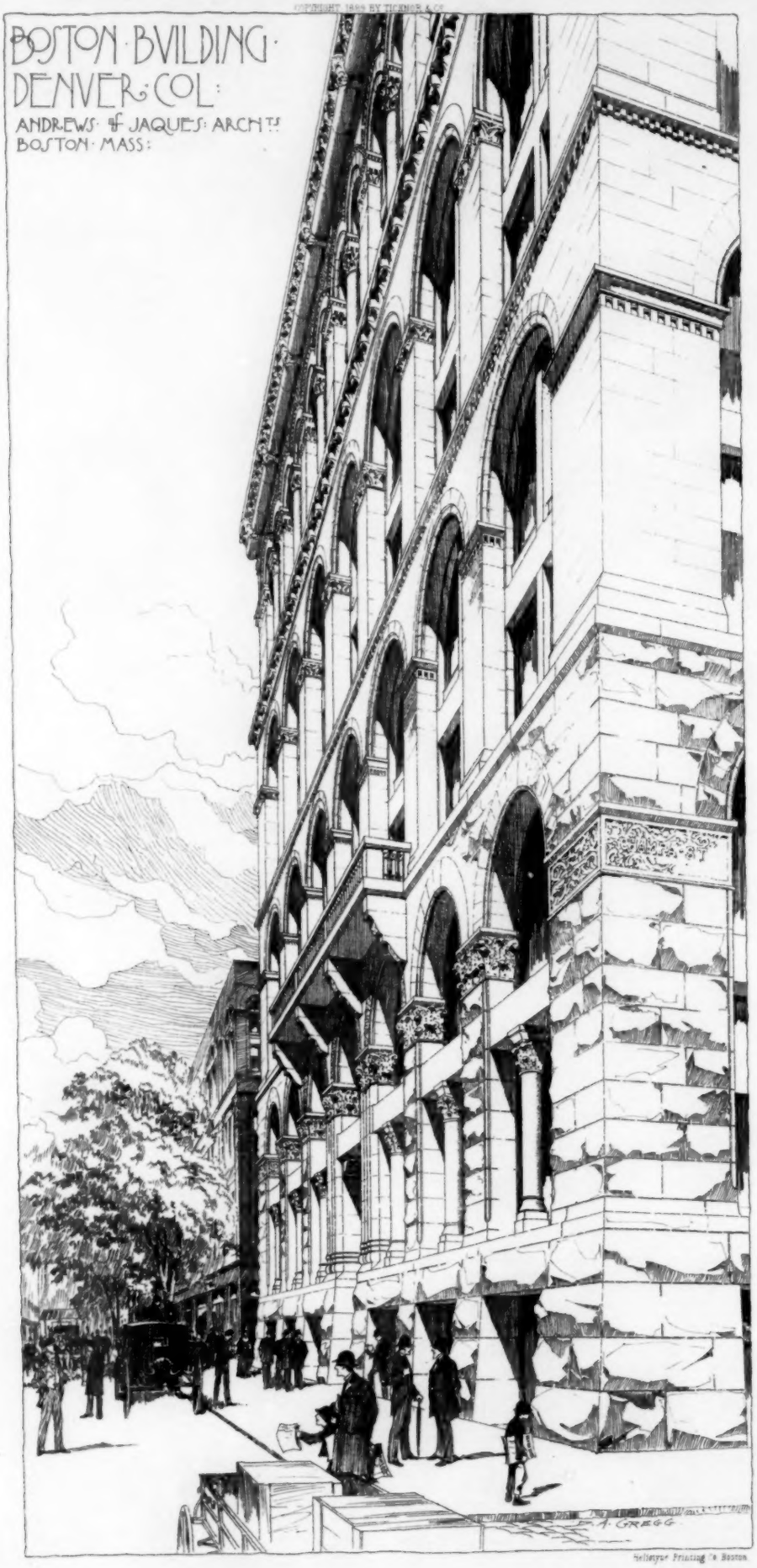
ANDREWS & JAQUES, ARCH'TS
BOSTON, MASS.



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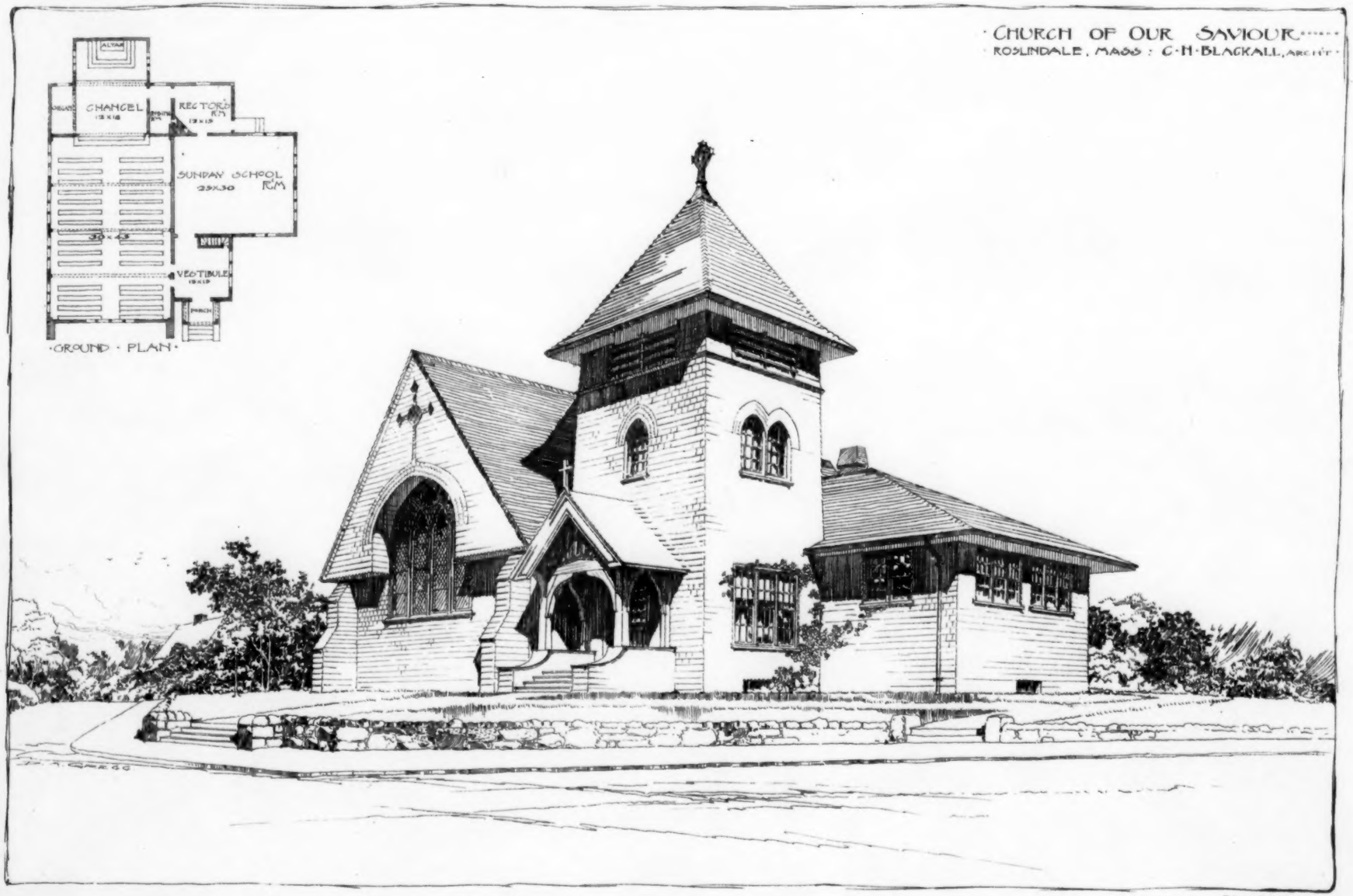

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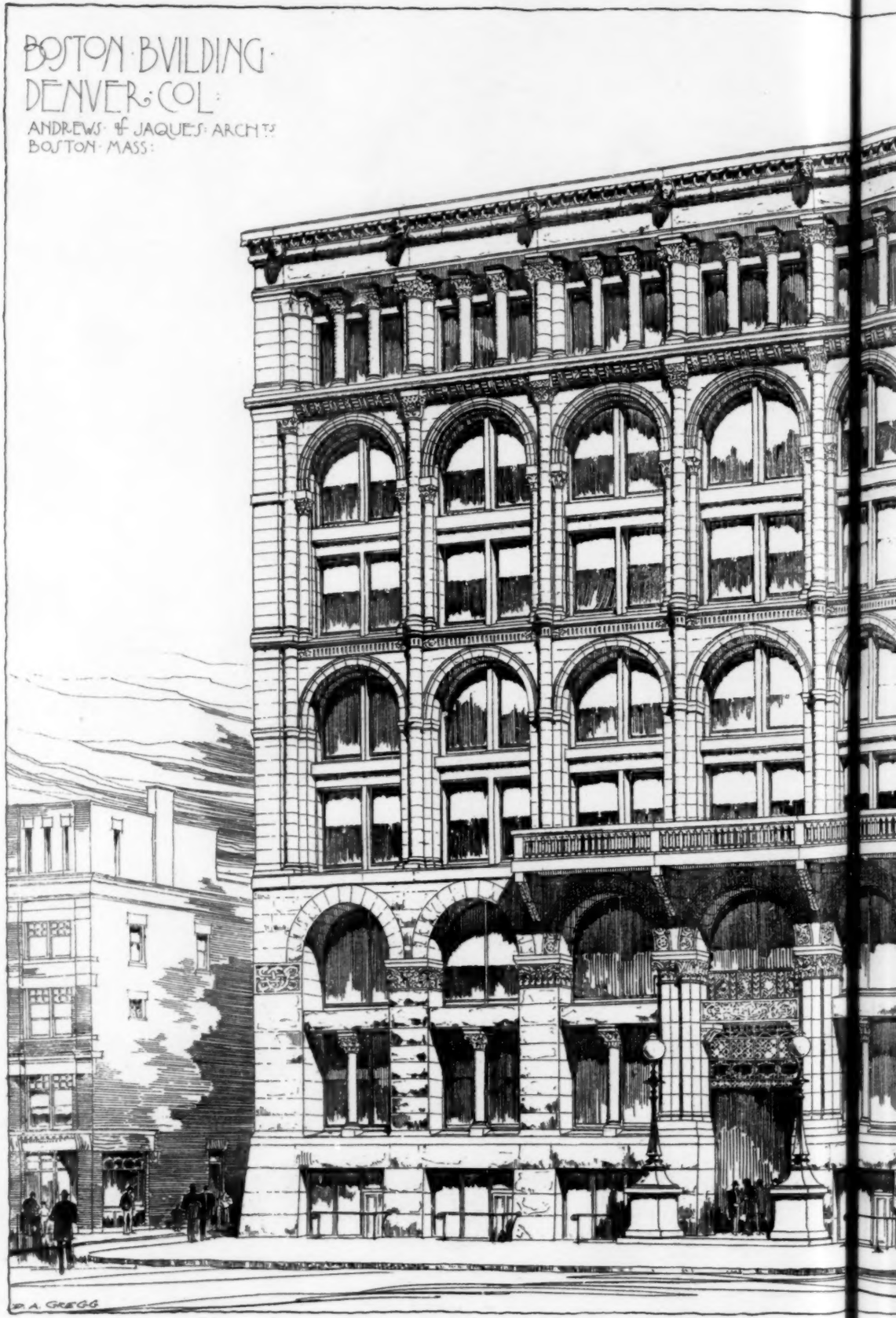
ANDREWS & JAQUES ARCHTS
BOSTON MASS:



Heliotype Printing Co. Boston.